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THE ECHIURIDAE, SIPUNCULIDAE AND PRIAPULIDAE COLLECTED BY THE SHIPS OF THE DISCOVERY COMMITTEE DURING THE YEARS 1926 TO 1937

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INTRODUCTION

THE extensive voyages of the Discovery Committee's ships in southern waters during the years 1926–37 have resulted in a considerable and interesting collection of Echiurids, Sipunculids and Priapulids being brought back. In all, sixteen species have been identified in the collections. Of these one is new to science and one is now recognized as being a larval form. The material has come mainly from the Antarctic area, but some of the Sipunculids were secured in the Atlantic on the outward and homeward runs.

The collection possesses several points of interest. Although only one new species is described, several are recorded from the Antarctic, Tristan da Cunha and Ascension for the first time. In other cases the known range of distribution has been considerably extended, thanks to the wide area over which the investigations were conducted.

The Echiurids have supplied the most important records. Until the present collections were made, the known representatives of this group in the Antarctic belonged to three species—namely, *Urechis chilensis* from the coasts of Chile, *Echiurus antarcticus* from South Georgia and *Thalassema verrucosum* from Kerguelen. While the first two species have again been taken in the original localities, there are now three other species to be added. Two of these, *Hamingia arctica* and *Thalassema faex*, are well-known species which have not so far been found in other than northern seas, and the third is *T. antarcticum*, the only new species described.

Most of the species of Sipunculids already recorded from the Antarctic have occurred in the collections, some from new localities. The collections of *Phascolosoma margaritaceum* have shown a considerably greater degree of variation than hitherto described, and the variety *trybomi*, previously recorded only once from the Antarctic, has been taken again. *Physcosoma nigrescens* is now recorded from the islands of Ascension and Tristan da Cunha, as is also *P. scolops* from the first-named island.

The Priapulids are represented by *Priapulus caudatus* var. *tuberculato-spinosus* only; this is rather surprising, since both *P. bicaudatus* and *P. horridus* have previously been taken within the area of the investigations and might have been expected to appear in the collections.

The comparative scarcity of many of these animals, or the inability of the standard collecting gear to secure them, is again brought out. In spite of the lengthy period of the Discovery investigations, several species are represented by only a single specimen.

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To Professor Dr Sixten Boch I am indebted for the loan of several specimens, named by Théel, for purposes of comparison.

To Mr R. J. Fant, Zoology Department, the University, Edinburgh, I am indebted for the photographs to illustrate this paper.

The collection is deposited in the British Museum (Natural History).

LIST OF THE SPECIES TAKEN

The following is the list of the species taken:

ECHIURIDAE.

1. *Echiurus antarcticus* Spengel.
2. *Urechis chilensis* Müller.
3. *Thalassema faex* Selenka.
4. *Thalassema antarcticum* sp.nov.
5. *Hamingia arctica* Koren and Danielssen.

SIPUNCULIDAE.

(*a*) Antarctic.

6. *Phascolosoma anderssoni* Théel.
7. *Phascolosoma margaritaceum* Sars.
8. *Phascolosoma nordenskjöldi* Théel.
9. *Phascolosoma ohlini* Théel.
10. *Phascolion strombi* (Montagu).

(*b*) Eastern Atlantic, etc.

11. *Pelagosphaera aloysii* Mingazzini. Larval form.
12. *Sipunculus nudus* Linnaeus.
13. *Physcosoma nigrescens* Keferstein.
14. *Physcosoma scolops* Selenka and de Man.
15. *Aspidosiphon mülleri* Diesing.

PRIAPULIDAE.

16. *Priapulus caudatus* Lamarck var. *tuberculato-spinosus* Baird.

LIST OF STATIONS WITH THE NAMES OF SPECIES COLLECTED AT EACH

R.R.S. 'DISCOVERY'

St. 1. 16. xi. 25. Clarence Bay, Ascension Island, 7° 55′ 15″ S, 14° 25′ 00″ W. Medium rectangular net, 16–27 m., coralline sand and shells.

Physcosoma nigrescens Keferstein; *P. scolops* Selenka and de Man.

St. 2. 17. xi. 25. Clarence Bay, Ascension Island, Catherine's Point and Collyer Point, shore collecting.

Physcosoma nigrescens Keferstein.

St. 4. 30. i. 26. Tristan da Cunha, 36° 55′ 00″ S, 12° 12′ 00″ W. Large dredge, stones, 40–46 m.

Physcosoma nigrescens Keferstein.

St. 6. 1. ii. 26. Tristan da Cunha, 3 miles N 30° E of Settlement. Large dredge, rock, 80–140 m.

Physcosoma nigrescens Keferstein.

St. 27. 15. iii. 26. West Cumberland Bay, South Georgia, 3·3 miles S 44° E of Jason Light. Large dredge, rock, 110 m.

Phascolosoma margaritaceum Sars; *Phascolion strombi* (Montagu).

St. 28. 16. iii. 26. West Cumberland Bay, South Georgia, 3·3 miles S 45° W of Jason Light. Conical dredge, 168 m.

Echiurus antarcticus Spengel.

St. 39. 25. iii. 26. East Cumberland Bay, South Georgia, from 8 cables S 81° W of Merton Rock to 1·3 miles N 7° E of Macmahon Rock. Otter trawl, grey mud, 179–235 m.

Phascolosoma ohlini Théel.

St. 42. 1. iv. 26. Off the mouth of Cumberland Bay, South Georgia, from 6·3 miles N 89° E of Jason Light to 4 miles N 39° E of Jason Light. Otter trawl, 120–204 m.

Phascolosoma anderssoni Théel; *P. ohlini* Théel; *Phascolion strombi* (Montagu).

St. 45. 6. iv. 26. 2·7 miles S 85° E of Jason Light, South Georgia. Grey mud, 238–270 m.

Echiurus antarcticus Spengel; *Phascolosoma anderssoni* Théel; *P. margaritaceum* Sars.

St. 90. 10. vii. 26. Off Simon's Town, False Bay, South Africa. Basin H.M. Dockyard. 1–2 m.

Physcosoma scolops Selenka and de Man.

St. 123. 15. xii. 26. Off the mouth of Cumberland Bay, South Georgia. From 4·1 miles N 54° E of Larsen Point to 1·2 miles S 62° W of Merton Rock. Otter trawl, grey mud, 230–250 m.

Phascolosoma anderssoni Théel; *P. ohlini* Théel.

St. 140. 23. xii. 26. Stromness Harbour to Larsen Point, South Georgia. 54° 02′ 00″ S, 36° 38′ 00″ W to 54° 11′ 30″ S, 36° 29′ 00″ W. Otter trawl, green mud and stones, 122–136 m.

Echiurus antarcticus Spengel; *Phascolion strombi* (Montagu).

St. 141. 29. xii. 26. East Cumberland Bay, South Georgia, 200 yards from shore under Mount Duse. Small beam trawl, 17–27 m.

Phascolosoma margaritaceum Sars; *Priapulus caudatus* Lamarck var. *tuberculato-spinosus* Baird.

St. 142. 30. xii. 26. East Cumberland Bay, South Georgia. From 54° 11′ 30″ S, 36° 35′ 00″ W to 54° 12′ 00″ S, 36° 29′ 30″ W. 88–273 m.

Echiurus antarcticus Spengel.

St. 144. 5. i. 27. Off the mouth of Stromness Harbour, South Georgia. From 54° 04′ 00″ S, 36° 27′ 00″ W to 53° 58′ 00″ S, 36° 26′ 00″ W. Coarse silk tow-net touched bottom, green mud and sand, 155–178 m.

Phascolion strombi (Montagu); *Priapulus caudatus* Lamarck var. *tuberculato-spinosus* Baird.

St. 148. 9. i. 27. Off Cape Saunders, South Georgia. From 54° 03′ 00″ S, 36° 39′ 00″ W to 54° 05′ 00″ S, 36° 36′ 00″ W. Grey mud and stones, 132–148 m.

Echiurus antarcticus Spengel.

St. 149. 10. i. 27. Mouth of East Cumberland Bay, South Georgia, from 1·15 miles N 76½° W to 2·62 miles S 11° W of Merton Rock. Otter trawl, mud, 200–234 m.

Phascolosoma ohlini Théel.

St. 159. 21. i. 27. South Georgia, 53° 52′ 30″ S, 36° 08′ 00″ W. Large dredge, rock, 160 m.
Phascolosoma ohlini Théel; *Phascolion strombi* (Montagu).

St. 160. 7. ii. 27. Near Shag Rocks, 53° 43′ 40″ S, 40° 57′ 00″ W. Large dredge, grey mud, stones and rock, 177 m.
Phascolion strombi (Montagu).

St. 167. 20. ii. 27. Off Signy Island, South Orkneys, 60° 50′ 30″ S, 46° 15′ 00″ W. Green mud, 244–344 m.
Echiurus antarcticus Spengel; *Priapulus caudatus* Lamarck var. *tuberculato-spinosus* Baird.

St. 170. 23. ii. 27. Off Cape Bowles, Clarence Island, 61° 25′ 30″ S, 53° 46′ 00″ W. Large dredge, rock, 342 m.
Phascolion strombi (Montagu).

St. 172. 26. ii. 27. Off Deception Island, South Shetlands, 62° 59′ 00″ S, 60° 28′ 00″ W. Large dredge, rock, 525 m.
Thalassema faex Selenka.

St. 175. 2. iii. 27. Bransfield Strait, South Shetlands, 63° 17′ 20″ S, 59° 48′ 15″ W. Mud, stones and gravel, 200 m.
Phascolosoma anderssoni Théel; *Phascolion strombi* (Montagu).

St. 182. 14. iii. 27. Schollaert Channel, Palmer Archipelago, 64° 21′ 00″ S, 62° 58′ 00″ W. Otter trawl, 278–500 m.
Thalassema antarcticum sp.nov.

St. 187. 18. iii. 27. Neumayer Channel, Palmer Archipelago, 64° 48′ 30″ S, 63° 31′ 30″ W. Large dredge, mud, 259 m.
Phascolion strombi (Montagu).

St. 190. 24. iii. 27. Bismarck Strait, Palmer Archipelago, 64° 56′ 00″ S, 65° 35′ 00″ W. Rock or stones and mud, 90–130 m.
Echiurus antarcticus Spengel.

St. 195. 30. iii. 27. Admiralty Bay, King George Island, South Shetlands, 62° 07′ 00″ S, 58° 28′ 30″ W. Large dredge, mud and stones, 391 m.
Priapulus caudatus Lamarck var. *tuberculato-spinosus* Baird.

St. 196. 3. iv. 27. Bransfield Strait, South Shetlands, 62° 17′ 30″ S, 58° 21′ 00″ W. Tow-net on bottom, mud, diatom ooze, 720 m.
Phascolosoma ohlini Théel.

St. 279. 10. viii. 27. Off Cape Lopez, French Congo, from 8·5 miles N 71° E to 15 miles N 24° E of Cape Lopez Light. Net attached to trawl, mud and fine sand, 58–67 m.
Aspidosiphon müllleri Diesing.

St. 283. 14. viii. 27. Off Annobon, Gulf of Guinea, 0·75–1 mile N 12° E of Pyramid Rock, Annobon. Large dredge, 18–30 m.
Physcosoma nigrescens Keferstein; *Aspidosiphon müllleri* Diesing.

R.R.S. 'DISCOVERY II'

St. 1569. 12. iv. 35. Off South-East Africa, 31° 50·3′ S, 32° 20·5′ E. Young fish trawl, 1200–1300 m.
Larval Sipunculid (*Pelagosphaera aloysii* Mingazzini).

St. 1645. 17. i. 36. Ross Sea, 77° 43·3′ S, 166° 18·2′ W. Conical dredge, 475 m.
Phascolosoma anderssoni Théel; *P. margaritaceum* Sars.

St. 1647. 18. i. 36. Ross Sea, 77° 43·8′ S, 171° 31·1′ W. Conical dredge, 420 m.
Phascolosoma margaritaceum Sars.

St. 1651. 22. i. 36. Ross Sea, 77° 04·3′ S, 176° 26·1′ W. Conical dredge, 594 m.
Phascolosoma anderssoni Théel; *P. margaritaceum* Sars.

St. 1653. 23. i. 36. Ross Sea, 74° 55′ S, 179° 49·1′ E. Conical dredge, 485 m.
Phascolosoma anderssoni Théel; *P. margaritaceum* Sars.

St. 1659. 26. i. 36. Ross Sea, 75° 43·9′ S, 173° 10·6′ E. Conical dredge, 512 m.
Phascolosoma anderssoni Théel.

St. 1660. 27. i. 36. Ross Sea, 74° 46·4′ S, 178° 23·4′ E. Otter trawl, 351 m.
Phascolosoma margaritaceum Sars.

St. 1873. 13. ii. 36. 61° 20·8′ S, 54° 04·2′ W. Dredge, 210–180 m.
Priapulus caudatus Lamarck var. *tuberculato-spinosus* Baird.

St. 1909. 30. xi. 36. Burdwood Bank, 53° 53·2′ S, 60° 29·9′ W. Conical dredge, 132 m.
Thalassema antarcticum sp.nov.

St. 1952. 11. i. 37. Admiralty Bay, King George Island, South Shetlands. Dredge, 367–383 m.
Priapulus caudatus Lamarck var. *tuberculato-spinosus* Baird.

St. 1958. 5. ii. 37. South Shetlands, 61° 17·9′ S, 52° 50·8′ W. Large dredge, 740 m.
Hamingia arctica Koren and Danielssen.

St. 1961. 12. ii. 37. South Orkneys, 60° 49·5′ S, 45° 27·5′ W. Dredge, green mud, 340–360 m.
Priapulus caudatus Lamarck var. *tuberculato-spinosus* Baird.

R.S.S. 'WILLIAM SCORESBY'

St. WS 33. 21. xii. 26. South Georgia, 54° 59′ 00″ S, 35° 24′ 00″ W. Tow-net on bottom, grey mud and stones, 130 m.
Phascolosoma ohlini Théel.

St. WS 62. 19. i. 27. Wilson Harbour, South Georgia, 15–90 m.
Echiurus antarcticus Spengel.

St. WS 73. 6. iii. 27. Falkland Islands, 51° 01′ 00″ S, 58° 54′ 00″ W. Otter trawl, fine dark sand, 121 m.
Phascolosoma margaritaceum Sars.

St. WS 80. 14. iii. 27. Falkland Islands, 50° 57′ 00″ S, 63° 37′ 30″ W. Otter trawl, fine dark sand, 152–156 m.
Phascolosoma margaritaceum Sars.

St. WS 84. 24. iii. 27. 7½ miles S 9° W of Sea Lion Island, East Falkland Islands. Otter trawl, coarse sand, shells and stones, 74–75 m.
Phascolosoma margaritaceum Sars.

St WS 85. 25. iii. 27. 8 miles S 66° E of Lively Island, East Falkland Islands, 52° 09′ 00″ S, 58° 14′ 00″ W to 52° 08′ 00″ S, 58° 09′ 00″ W. Otter trawl, sand and shells, 79 m.
Phascolosoma margaritaceum Sars.

St. WS 89. 7. iv. 27. 9 miles N 21° E of Arenas Point light, Tierra del Fuego. Otter trawl, mud, gravel and stones, 21–23 m.
Phascolosoma margaritaceum Sars.

St. WS 128. 10. vi. 27. West side of Gough Island, inshore, 40° 19′ 00″ S, 10° 04′ 00″ W. Large dredge, 90–120 m.
Sipunculus nudus Linnaeus.

St. WS 179. 7. iii. 28. South Georgia, 55° 08′ 00″ S, 35° 20′ 00″ W. Mud, stones and shells, 125 m.
Phascolion strombi (Montagu).

St. WS 212. 30. v. 28. Falkland Islands, 49° 22′ 00″ S, 60° 10′ 00″ W. Tow-net on bottom, green sand, mud and pebbles, 242–249 m.

Phascolosoma nordenskjöldi Théel.

St. WS 225. 9. vi. 28. Falkland Islands, 50° 20′ 00″ S, 62° 30′ 00″ W. Net attached to trawl, green sand, shells and pebbles, 161–162 m.

Phascolosoma nordenskjöldi Théel; *P. margaritaceum* Sars.

St. WS 236. 6. vii. 28. Falkland Islands, 45° 55′ 00″ S, 60° 40′ 00″ W. Net attached to trawl, dark green sand and mud, 272–300 m.

Phascolosoma nordenskjöldi Théel.

St. WS 237. 7. vii. 28. North of the Falkland Islands, 45° 00′ 00″ S, 60° 05′ 00″ W. Net attached to trawl, coarse brown sand and shells, 150–256 m.

Phascolosoma nordenskjöldi Théel.

St. WS 244. 18. vii. 28. Falkland Islands, 52° 00′ 00″ S, 62° 40′ 00″ W. Net attached to trawl, fine dark sand and mud, 247–253 m.

Phascolosoma anderssoni Théel.

St. WS 246. 19. vii. 28. Falkland Islands, 52° 25′ 00″ S, 61° 00′ 00″ W. Net attached to trawl, coarse green sand and pebbles, 208–267 m.

Phascolosoma nordenskjöldi Théel.

St. WS 248. 20. vii. 28. Falkland Islands, 52° 40′ 00″ S, 58° 30′ 00″ W. Otter trawl, fine green sand, pebbles and shells, 210–242 m.

Phascolosoma margaritaceum Sars.

St. WS 250. 20. vii. 28. Falkland Islands, 51° 45′ 00″ S, 57° 00′ 00″ W. Otter trawl, fine green sand, 251–313 m.

Phascolosoma margaritaceum Sars.

St WS 777. 3. xi. 31. Off Patagonia, 45° 56′ 00″ S, 66° 24′ 00″ W. Otter trawl, green mud and sand, 98–99 m.

Urechis chilensis Müller.

St. WS 783. 5. xii. 31. Falkland Islands, 50° 03′ 30″ S, 60° 08′ 00″ W. Conical dredge, rock, mud and sand, 155 m.

Phascolosoma anderssoni Théel.

St WS 788. 13. xii. 31. Off Patagonia, 45° 05′ 00″ S, 65° 00′ 00″ W. Otter trawl, grey mud and sand, 82–88 m.

Phascolosoma margaritaceum Sars. ? var. *hanseni* Koren and Danielssen.

St WS 840. 6. xi. 32. Falkland Islands, 53° 52′ 00″ S, 61° 49′ 15″ W. Otter trawl, green-grey sand, 368–463 m.

Phascolosoma ohlini Théel.

MARINE BIOLOGICAL STATION

St. MS 27. 29. iv. 25. 1¼ miles SW by W of Merton Rock, East Cumberland Bay, South Georgia. Small dredge, 200 m.

Phascolosoma margaritaceum Sars.

St. MS 68. 2. iii. 26. East Cumberland Bay, South Georgia, 1·7 miles S ½ E to 8½ cables SE by E of Sappho Point. Large rectangular net, 220–247 m.

Phascolosoma nordenskjöldi Théel.

St. MS 74. 17. iii. 26. East Cumberland Bay, South Georgia, 1 cable SE by E of Hope Point to 3·1 miles SW of Merton Rock. Small beam trawl, 22–40 m.

Phascolosoma margaritaceum Sars.

MISCELLANEOUS COLLECTIONS

18. ii. 27. Port Stanley Harbour, Falkland Islands. Shore collection amongst mussels.
Phascolosoma margaritaceum Sars. var. *trybomi* Théel.

22. ix. 27. Port Stanley Harbour, Falkland Islands.
Priapulus caudatus Lamarck var. *tuberculato-spinosus* Baird.

22. xii. 28. South Georgia. Fish trap, stomach of *Notothenia rossi*, 4–5 m.
Priapulus caudatus Lamarck var. *tuberculato-spinosus* Baird.

1926. Saldanha Bay beach, Cape Province.
Physcosoma scolops Selenka and de Man.

22. ii. 31. Larsen Harbour, South Georgia.
Echiurus antarcticus Spengel. Hand line, stomach of *Notothenia rossi*, 10–20 m.

BIPOLAR DISTRIBUTION

The close similarity, amounting in many cases to specific identity, between Arctic and Antarctic species belonging to the Echiuridae, Sipunculidae and Priapulidae is further exemplified in the Discovery collections.

For convenience, the northern limit of the Antarctic and sub-Antarctic fauna may be taken as 40° S as has already been done by Fischer (1920, p. 414), with certain exceptions. For example, at Kerguelen and to the south of New Zealand we find some species appearing south of 40° S which obviously belong to the warmer waters to the north, and these are not included in the table. In the following list, which includes the species which come strictly under the above heading, localities are added only for those species which have not been mentioned in the text.

The species may be divided into three groups:

(*a*) Those which are identical with, or regarded as varieties of, Arctic species.

(*b*) Those which are very closely related to Arctic forms but which are still regarded as specifically distinct.

(*c*) Those which are not closely related to Arctic species.

Grouped in this way the recorded species are as follows:

ECHIURIDAE.

(*a*) *Thalassema faex* Selenka.

(*a*) *Hamingia arctica* Koren and Danielssen.

(*b*) *Echiurus antarcticus* Spengel.

(*c*) *Urechis chilensis* Müller.

(*c*) *Thalassema verrucosum* Studer.
Kerguelen. Collin (1901, p. 306), Fischer (1916, p. 17).

(*c*) *Thalassema antarcticum* sp.nov.

SIPUNCULIDAE.

(*a*) *Phascolosoma margaritaceum* Sars.

(*a*) *Phascolosoma muricaudatum* Southern.
Bouvet Island. Fischer (1916, p. 15).

(*a*) *Phascolosoma minutum* Keferstein.
Falkland Islands. Théel (1911, p. 31).

(*a*) *Phascolosoma eremita* Sars var. *australe* Benham.
Commonwealth Bay. Benham (1922, p. 17).

(*a*) *Phascolosoma intermedium* Southern.
Commonwealth Bay. Stephen, B.A.N.Z.A.R.E.[1] Rep. (in the Press).

(*a*) *Phascolion strombi* (Montagu).

(*b*) *Phascolosoma benhami* Stephen.
Off Kemp Island; off Adélie Land. Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).

(*c*) *Phascolosoma anderssoni* Théel.

(*c*) *Phascolosoma charcoti* Hérubel.
Port Charcot. Hérubel (1908, p. 2).

(*c*) *Phascolosoma nordenskjöldi* Théel.

(*c*) *Phascolosoma ohlini* Théel.

(*c*) *Phascolosoma pudicum* Selenka.
Kerguelen. Selenka (1885, p. 11); Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).

(*c*) *Phascolosoma mawsoni* Benham.
Commonwealth Bay. Benham (1922, p. 13).
Off Enderby Land: off Kemp Land. Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).

(*c*) *Phascolion lutense* Selenka.
Southern Indian Ocean. 53° 55′ S, 108° 35′ E; 62° 26′ S, 95° 44′ E. Selenka (1885, p. 16).

Priapulidae.

(*a*) *Priapulus caudatus* Lamarck var. *tuberculato-spinosus* Baird.

(*a*) *Priapulus bicaudatus* Koren and Danielssen var. *australis* de Guerne.
Patagonia; South Shetlands. De Guerne (1888, p. 13).

(*c*) *Priapulus horridus* Théel.
Coast of Uruguay. Théel (1911, p. 24).

Thus of the twenty-three species listed, ten come under category (*a*) and two under (*b*); that is, half are either northern species or very closely related to them. While this phenomenon of bipolarity is well known and is seen in other groups of animals, it would appear, when all the records are examined, to be as well shown in these groups as any.

The question of bipolarity has been discussed by several authors and more than one theory put forward to account for the facts. It seems too early as yet to try to theorize, especially in view of the considerable additions made by the B.A.N.Z.A.R.E. and Discovery Expeditions. Also, in spite of the considerable surveys made, several species are represented by only one or two specimens. Intensive work would almost certainly secure many more records which might show a very different picture. One fact, however, seems to stand out and may represent a real condition, namely, that in the Antarctic most of these bipolar species seem to be confined to the South American quadrant.

[1] British, Australian and New Zealand Antarctic Research Expedition.

ECHIURIDAE

Genus Echiurus Pallas

1. **Echiurus antarcticus** Spengel. Plate VII, fig. 1.

Echiurus antarcticus Spengel, 1912, p. 200.

DISTRIBUTION. South Georgia; Grytviken, Cumberland Bay: Spengel, loc. cit.

OCCURRENCE. South Georgia: St. WS 62. 15–90 m.
Larsen Harbour, 10–20 m.
St. 28. 168 m.
St. 45. 238–270 m.
St. 140. 122–136 m.
St. 142. 88–273 m.
St. 148. 132–148 m.
St. 167. 244–344 m.
South Shetlands: St 190. 90–130 m.

Our knowledge of this species rests on the specimens described by Spengel from South Georgia. In the collections there are examples from nine stations, but these, with one exception, are still in close proximity to the original place of capture. The new record comes from St. 190 in the Bismarck Strait, South Shetlands, and this marks a considerable extension in the known range of the species, this station being nearly a thousand miles from South Georgia. It should be stated, however, that this record rests on the presence of a single introvert in the collection, no other portions of the animal being found. This introvert is very similar to that contained in the same tube as the specimen of *Echiurus antarcticus* at St. 167 which, I presume, belonged to this species.

In all, fourteen specimens were taken and these came from nine stations. At seven of these stations only a single specimen was found, but at Wilson Harbour five animals were brought up by the grapnel, and off Signy Island two specimens were secured with net N 4-T.

The species is a fairly deep water one, the range in depth at which it was taken by the Discovery Committee's ships varied from 88 to 344 m., with the single exception of the shallow-water station in Larsen Harbour where the depth was under 20 m.

Spengel, in his description of the species, gives as distinctions between this species and the northern *Echiurus echiurus* Pall.: (1) the arrangement of the papillae on the skin, (2) the shape of the introvert, (3) the number of nephridia.

In *E. echiurus* the small papillae lying between the well-marked rows of large papillae are also arranged in rows. In *E. antarcticus* Spengel states that the small papillae are not arranged in this manner but are scattered. In most of the Discovery specimens the small papillae are not very distinct, but an examination of the animals shows that the small papillae, which at first sight appear to be scattered at random, are really arranged in rows. The rows, however, are very incomplete and gaps of varying width occur.

The second distinction between the two species lies in the form of the introvert. In *E. echiurus* this takes the form of a short stout truncate cylinder, with longitudinal

ribbing on the inner surface. As has already been stated, two introverts were found in the collection, one of which was included in the same tube as a specimen of *E. antarcticus* and the other was in a tube alone. Spengel (1912, p. 200) also found a similar unattached introvert which he assumed belonged to this species. The two introverts in the Discovery collections were very similar. The one from St. 167 measured about 65 mm. in length and about 18 mm. at its broadest part. At the posterior end where it had been attached to the body it was rolled into a small tube for a distance of about 5 mm., thereafter broadening out into a more or less uniform wide flap. At the anterior end it was slightly T-shaped. The colour throughout was cream, except along the edges where it was light brown. The inner surface was practically smooth throughout, except for a slight ribbing along the edges. The introvert found at St. 190 was in all respects similar. It was about 50 mm. in length and about 11 mm. at its greatest breadth.

The third distinction lies in the number of nephridia. In *E. echiurus* there are two pairs and in *E. antarcticus* Spengel suggests that there may be three pairs. The nephridia are evidently easily destroyed and seem to macerate first, and in most cases I was unable to come to a definite decision as to the number of nephridia in the Discovery specimens except in the case of three of the specimens where there seemed definitely to be only two pairs.

Thus, of the three suggested distinctions between the two species given by Spengel only the difference in the shape and structure of the introvert seems to be valid, judging by the Discovery specimens. Spengel had doubts as to whether the two species were really distinct. They are without any doubt very closely related, but the very different structure of the introvert would seem to suggest that in the meantime the two should be kept apart.

In most of the specimens the setae in the two posterior rows were too damaged to make it possible to count them, but fortunately in several of the specimens the rows appeared to be complete, and the counts were as follows: In the five specimens from Larsen Harbour two had seven setae in each row, while the remaining three had seven setae in the inner row and eight in the outer row. In the animals from West Cumberland Bay there were nine setae in the inner row but the outer row was too damaged for counting. In the specimen from East Cumberland Bay there were eight setae in each row. Taking the collection as a whole, there would seem to be, on the average, seven to nine setae in the inner row and seven to eight in the outer row. There would seem to be a good deal of variation, since Spengel (1912, p. 201) gives for his specimens ten setae as the number in the outer row and five in the inner row.

Genus Urechis Seitz

2. Urechis chilensis (Müller).

Echiurus chilensis Müller, 1852, p. 21.
E. farcimen Baird, 1873, p. 97.
E. chilensis Müller, Fischer, 1896, p. 6.
Urechis chilensis (Müller), Seitz, 1907, p. 323.

Distribution. Chile: Müller, loc. cit.
Chile: Punta Arenas, Magellan Straits: Baird, Fischer, loc. cit.
Chile: coast near Tumbes (I presume this is the town about 20 miles north of Conception), Seitz, loc. cit.

Occurrence. Off Patagonia: St. WS 777. 98–99 m.

One specimen approximately 140 mm. in length was taken off Patagonia. While the species has been recorded on several occasions from the eastern side of the Continent, this is the first record from the Atlantic coast.

The animal had the body wall damaged in places. The papillae on approximately the last 2 cm. of the body were higher than those in the middle. The same was true of the area just behind the introvert. There for a depth of about 1·5 cm. the papillae were higher than in the middle of the body and gave the skin a scaly appearance. There were ten anal bristles, irregularly spaced. The three pairs of segmental organs were all very long and reached to within about 2 cm. of the posterior end of the body. The first two pairs were very much swollen, the largest having a maximum diameter of about 8 mm. The third pair were merely long thin tubes.

Genus Thalassema Lamarck

The only species belonging to this group so far reported from the Antarctic is *Thalassema verrucosum* described by Studer (1879, p. 124) from Kerguelen. So far as the family itself is concerned, it is mainly a tropical one and few species have been found in the colder seas. The collections of these animals brought back by the 'Discovery' is therefore of special interest, since six individuals belonging to two species hitherto unrecorded in the Antarctic were secured. A further point of interest is that one of these species is a well-known Arctic form. Both the stations at which they were found were from fairly deep water.

3. Thalassema faex Selenka. Plate VII, fig. 2.

Distribution. Arctic seas off Norway, etc.

Occurrence. South Shetlands: St. 172. 525 m.

Three specimens were secured. Two were complete and the third was fragmentary. All were strongly contracted.

The introvert was small in comparison with the length of the body. In the two complete specimens the bodies were 45 and 20 mm. and the respective introverts 5 and 4 mm. When fully expanded the introvert may be longer. The skin was white with only a few indistinct papillae. The digestive tract was filled with black rock fragments of all sizes from fine grains to fragments about 2 mm. in length. This dark mass showed distinctly through the skin. The longitudinal muscles were continuous. There was only a single pair of nephridia, white in colour, and containing a few large round ova. The specimens seem to correspond closely to the northern species and to be identified with it.

4. Thalassema antarcticum sp.nov. Plate VII, figs. 3, 4.

Occurrence. Falkland Islands: St. 1909. 132 m.
Palmer Archipelago, Schollaert Channel: St. 182. 278–500 m.

Holotype. The introvert seemed to be fully expanded and was much longer than the body, which was short and cylindrical. The body measured 27 mm. and the introvert 52 mm. In preservative the introvert was straw-coloured with a darkened thickened edge all round, while the body was grey-brown. In life, however, the colour was more vivid, as the colour note made at the time of capture indicates: 'found embedded in the heart of a dark green clayish rock, only the ribbon-like introvert protruding through a chink in the surface of the rock and waving gently to and fro. Body pale yellow-white, translucent, the viscera showing through. The introvert pale milk-white, translucent, edged with opaque porcelain-white.'

The surface of the introvert was smooth and the thickened edge had indentations at intervals. The tip was not divided but had an indentation similar to those along the sides.

The body was smooth in appearance, and only under magnification were the very small papillae visible. These papillae were very small, elongated, white bodies and were seen only in the middle of the body. The skin at the extremities of the body was somewhat corrugated.

The longitudinal muscles were continuous. There were two yellow ventral setae. These were rectangular in shape in the end portion when seen in full and are only slightly bent at the tip when seen in profile.

There was only one pair of segmental organs and they had no spiral appendages. They were thin white tubes and narrowed at the lower end into a still thinner tube which bore the funnel at its lower end.

Holotype taken at St. 1909. Deposited at the British Museum (Nat. Hist.).

At St. 1909 an introvert similar to that possessed by the type was also taken, and a similar colour note attached to it.

At St. 182 a much larger animal was taken, which seemed to belong to this species. The body measured 67 mm. The introvert measured only 33 mm., this comparative shortness compared with those at St. 1909 being due to contraction. Such a difference due to the state of the animal when preserved has been illustrated by Shipley (1899, pl. xxxiii, figs. 5, 6, p. 338) in the case of *Thalassema neptuni*. The introvert was similar in appearance to the others mentioned. The ventral setae had been lost. The two segmental organs were long thickish tubes, almost three-quarters the length of the body and filled with small ova.

This species differs from others of its genus possessing continuous longitudinal muscles and a single pair of segmental organs, in the lack of papillae on the body and in the long ribbon-like introvert.

Genus Hamingia Koren and Danielssen

5. Hamingia arctica Koren and Danielssen. Plate VIII, fig. 1.

DISTRIBUTION. Arctic seas.

OCCURRENCE. St. 1958, South Shetlands. 740 m.

One contracted specimen only was secured. The body measured 28 mm. and the introvert 20 mm. The diameter of the body at the widest part was 13 mm. In alcohol the colour was a uniform dull grey-green, and the body wall in the posterior half was sufficiently thin for the rod-like pellets filling the digestive tract to be seen. In the living state, however, the animal was highly coloured as the colour note made at the time of capture indicates: 'body an extraordinarily vivid grass green, introvert very pale weak-milk white.'

The skin was very tough. The whole animal was contracted and the body was filled with a mass of elongated cylindrical clay pellets of varying size, rounded at the extremities. Owing to the tough nature of the skin and the closely packed mass of clay pellets in the digestive tract, considerable maceration had taken place and the walls of the gut had completely disappeared, as well as some of the other structures. Any comparison of the course and shape of the digestive tract was out of the question.

Two accounts of the appearance and anatomy of this species have been given: the original one by Koren and Danielssen (1881, p. 20) and a later one by Wesenberg-Lund (1934, p. 7).

With regard to the Discovery specimen, the body was smooth as described by Koren and Danielssen, not warty at the extremities as in the specimen described by Wesenberg-Lund. The two prominent cylindrical papillae described by Koren and Danielssen were not seen in the Discovery specimen, as was also the case in Wesenberg-Lund's specimens. Two low hemispherical bulges of the body wall appeared on the anterior ventral side some distance apart on the Discovery specimen about 3 mm. from the base of the introvert. They seemed, however, to be accidental bulges rather than related to the papillae in question. They were at some considerable lateral distance from the openings of the nephridia.

The introvert formed an almost closed tube for most of its length. It was somewhat macerated. The tip was T-shaped and folded. When the tip was unfolded as in the figure, it was seen to be bifid but the arms were comparatively short, much shorter than those figured by Wesenberg-Lund (1934, fig. 1), but this may not be significant since the Antarctic specimen was somewhat macerated and further was more contracted than the specimen figured.

As previously indicated, the digestive tract was completely macerated. The anal trees were also incomplete but seemed quite in keeping with previous descriptions. Two small nephridia were present, opening to the exterior close behind the introvert.

In spite of the great difference in distance between the known areas of distribution, the Arctic and Antarctic specimens seem sufficiently similar for them to be linked under the same species.

SIPUNCULIDAE

Considerable collections of these animals were secured both in the Antarctic and on the outward and homeward voyages. Since these latter stations are incidental to the Antarctic survey proper and the species secured are tropical ones, the two sets of species are listed separately.

(*a*) SPECIES TAKEN IN ANTARCTIC WATERS

Genus Phascolosoma F. S. Leuckart

6. Phascolosoma anderssoni Théel. Plate VIII, fig. 2.

Phascolosoma anderssoni Théel, 1911, p. 28.

DISTRIBUTION. South Georgia, Graham Land Region: Théel, loc. cit.
65° 48′ S, 53° 16′ E: Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).
66° S, 140° E: Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).
66° 45′ S, 62° 03′ E: Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).
67° 03′ S, 74° 29′ E: Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).

OCCURRENCE.

Falkland Islands:	St. WS 244. 247–253 m.
	St. WS 783. 155 m.
South Georgia:	St. 42. 120–204 m.
	St. 45. 238–270 m.
	St. 123. 230–250 m.
South Shetlands:	St. 175. 200 m.
Ross Sea:	St. 1645. 475 m.
	St. 1651. 594 m.
	St. 1653. 485 m.
	St. 1659. 512 m.

This species has been recorded by Théel from South Georgia and the Graham Land region. It was also taken by the B.A.N.Z.A.R.E. on the edge of the Antarctic Continent off Adélie Land, etc. The Discovery collections show that it occurs over a much wider area of the Antarctic. In these collections it was not taken in the Graham Land region, although already recorded from there, but was taken at South Georgia. It is now recorded from the Falklands and, more interestingly, from four stations in the Ross Sea.

There is not a great deal to add to Théel's excellent description, but the number of specimens in the Discovery collections enables the description to be elaborated at one or two points. In Théel's specimens the skin was thin, shining and semi-transparent. While this was true of the small specimens in the collection and a number of the large ones taken by the 'Discovery', other large specimens had the skin over the introvert or over the whole body dull and opaque. In some the introvert was stained with brown or black.

Théel has also described the papillae in his specimens as being cylindrical over the body except at the girdle of vesicles, but in all these Discovery specimens as the girdle of vesicles was approached from the anterior end the papillae tended to be more or less swollen at the base and had the general appearance of a narrow cone. In some of the specimens one or two of the papillae were set on isolated vesicles.

The portion of the body carrying the girdle of vesicles varied greatly in shape. In some specimens it was of the same diameter as the body but in others was swollen to varying degrees, in the extreme case being almost like a ball, with the viscera showing through the wall. Where this portion was greatly expanded the 'tail' was usually prominent, but in two of the smaller specimens the tail was very inconspicuous and the area with vesicles narrow so that the end of the body looked rounded with the girdle like a cap at the end.

Most of the specimens were not fully expanded but, allowing for this, a comparison of the lengths of the animals is interesting. Most of Théel's specimens from South Georgia were small, but his specimens from Graham Land region he called 'large'; the largest was, however, only 100 mm. in length. While the three specimens taken at the Falklands and South Georgia were small, measuring some 15–45 mm. in length, the specimens from the Ross Sea were almost all large, in most cases greatly exceeding 100 mm. For example, at St. 1645 the largest specimen, fully expanded, measured 250 mm., while two others, not fully expanded, measured 190 and 140 mm. respectively. At Sts. 1651 and 1653 specimens equally large were taken. At St. 1659 the specimens tended to be smaller, being only some 130–140 mm. in length.

The species seems to live in moderately deep water. Théel gave a record from South Georgia of only 75 m. but the Discovery specimens ranged from 120 to 594 m.

7. Phascolosoma margaritaceum Sars. Plate VIII, figs. 3, 4.

Sipunculus margaritaceus Sars (1851, p. 196).
Phascolosoma capsiforme Baird (1868, p. 83).
P. antarcticum Michaelsen (1889, p. 3).
P. fuscum Michaelsen (1889, p. 3).
P. georgianum Michaelsen (1889, p. 3).
P. margaritaceum Sars var. *capsiforme* Baird, Fischer (1896, p. 3).
P. margaritaceum Sars ?, Théel (1911, p. 26).
P. margaritaceum Sars, Fischer (1920, p. 409).
P. socium Lanchester (1908, p. 1).
P. antarcticum Hérubel (1908, p. 1).
P. margaritaceum var. *capsiforme* Baird, Benham (1922, p. 7).
P. capsiforme Baird, Pratt (1898, p. 16); Shipley (1902, p. 285).

DISTRIBUTION. Falkland Islands: Baird, Théel, Pratt.
South Georgia: Michaelsen, Théel.
Tierra del Fuego: Théel.
Graham Region: Théel, Fischer.
Cape Adare: Shipley.
Port Charcot: Hérubel.
Commonwealth Bay: Benham.
Ross Sea: Lanchester.

OCCURRENCE. Off Patagonia: St. WS 89. 21–23 m. One small specimen.
St. WS 788. 82–88 m. Five medium-sized and small specimens.
Falkland Islands: St. WS 73. 121 m. Six small and three very small specimens.
St. WS 80. 152–156 m. One medium-sized specimen.
St. WS 84. 74–75 m. Three medium-sized, two small specimens.

Falkland Islands: St. WS 85. 79 m. One medium-sized specimen.
St. WS 225. 161–162 m. One medium-sized specimen.
St. WS 248. 210–242 m. One medium-sized specimen.
St. WS 250. 251–313 m. One medium-sized specimen.

South Georgia: St. MS 27. 200 m. Two medium-sized specimens.
St. MS 74. 22–40 m. One small specimen.
St. 27. 110 m. One very small specimen.
St. 45. 238–270 m. One medium-sized specimen, one small.
St. 141. 17–27 m. Three medium-sized specimens.

Ross Sea: St. 1645. 475 m. Four large specimens.
St. 1647. 420 m. One medium-sized specimen.
St. 1651. 594 m. One small specimen.
St. 1653. 485 m. One large specimen.
St. 1660. 351 m. One medium-sized specimen.

This species is one of the commonest and best known Antarctic forms. It appears to be subject to very considerable variation. As the synonymy shows, several varieties and even species have been described which later have been rejected and linked with this species. Variation seems greatest in the very large and, presumably, old individuals and seems to follow the same general trend in both hemispheres. Varieties *hanseni* and *trybomi*, previously described from Arctic waters, have now been taken in the Antarctic and, conversely, the variety *antarcticum*, described from South Georgia, has been recorded by Sato (1939, p. 409) from Japanese waters. The large animals from Sts. 1647, 1653 and 1660 from the Ross Sea do not, at first sight, suggest this species. On the balance of characters, however, it has been considered right to regard them as old individuals of this species, possibly considerably affected by the nature of the habitat.

The specimens from the Ross Sea were mostly very large animals and showed a good deal of variation in the thickness and appearance of the body wall. The animals from Sts. 1647 and 1660 were most alike in appearance. That from St. 1660 was contracted into a short cylinder and the body measured 24 mm. The body wall was thin and transparent so that the closely coiled gut showed through. The specimen from St. 1647 was expanded and measured 125 mm. overall and had the usual pearl grey colour.

The specimen from St. 1653 was peculiar in appearance. It was contracted and measured 150 mm. overall. The anterior part of the body was yellow in colour and very firm in texture. The rest of the animal was dirty grey in colour and the skin was very thin so that the gut was quite visible. The animal had the appearance of having been living in a tube or in very dense clay soil. The animal from St. 1651 was of medium size. As in the preceding specimen, it was yellow anteriorly but the body was firm and uniform throughout. The four specimens from St. 1645 were dissimilar in appearance. Two were pearly grey in appearance and resembled those from St. 1647. The two other animals were dirty grey in colour with a good deal of black deposit on them. The skin was very rough and corky in appearance. All specimens were damaged so that measurements could not be given, but they were all very large. Although so very different in appearance, the specimens seemed all to belong to this species. In most specimens the typical criss-cross markings of the skin were seen. The chief difference noted was that

the gut seemed much larger in proportion. In most specimens the body was filled with a large mass of gut filled with fine mud, and the retractors occupied only a very small area in the anterior third, very similar to the proportions of the variety *trybomi*.

? var. hanseni Koren and Danielssen.

The specimens from St. WS 788 were four in number and ranged from 29 to 64 mm. in length, overall. They seemed to approach this variety. The smallest two specimens were fairly typical, but even in them the skin at the two extremities of the body was assuming a corky appearance, and in the second smallest specimen just below the introvert was a small area where the skin was becoming corky in appearance and pitted with pores, like little rounded pits. In the largest specimen a considerable area at each end of the body had a rough corky appearance, and the whole intermediate area of the body had these small pits scattered over it. Internally, however, the specimens differed from the variety in that the bases of the retractors were not divided.

var. trybomi Théel.

Phascolosoma trybomi Théel, 1905, p. 69.
P. margaritaceum Sars var. *trybomi* Théel, Fischer, 1924, p. 69; 1925, p. 19.
P. trybomi Théel, Stephen, 1936, p. 166.
P. margaritaceum Sars var. *trybomi* Théel, Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).

Distribution. Arctic seas: Théel, loc. cit.; Stephen, loc. cit.
Antarctic, off Sabrina Land, 64° 28′ S, 114° 59′ E: Stephen, loc. cit.

Occurrence. Falkland Islands, Port Stanley Harbour, on the shore amongst mussels. 18. ii. 27.
One specimen, about 115 mm. in length, was secured.

It was undamaged externally, but was somewhat macerated internally. The gut was in part destroyed so that the coils could not be counted. The specimen corresponded closely to that figured by Théel and also with a specimen in my possession taken in the northern North Sea, but with a small difference in colour. The animal from the Falkland Islands was dirty grey both externally and internally and lacked the mother-of-pearl lustre on the inside of the body well seen in the northern specimens. The Scottish specimen was rose pink both externally and internally. This form has only been recorded on a very few occasions in northern waters, usually from fairly deep water. It is interesting to find it in the Antarctic, although it has already been recorded in the collections made by the B.A.N.Z.A.R.E.

8. Phascolosoma nordenskjöldi Théel.

Phascolosoma nordenskjöldi Théel, 1911, p. 30.

Distribution. Falkland Islands and South Georgia: Théel, loc. cit.
Kerguelen: Stephen, B.A.N.Z.A.R.E. Rep. (in the Press).

Occurrence. South Georgia: St. MS 68. 220–247 m. 'From root of giant sponge.'
Falkland Islands: St. WS 212. 242–249 m.
St. WS 225. 161–162 m.
St. WS 236. 272–300 m.
St. WS 237. 150–256 m.
St. WS 246. 208–267 m.

This is a small species. The largest specimen described by Théel measured only 9 mm. in length, and the Discovery specimens were mostly about this size. It was first taken at South Georgia and the Falkland Islands and the Discovery specimens came from much the same area, namely, from South Georgia and from an extensive patch lying to the north of the Falkland Islands along the edge of the continental shelf. It has also been found at Kerguelen, having been taken there by the B.A.N.Z.A.R.E. in 1930.

The depths in which it was taken were also considerably in excess of these previously recorded. At the Falkland Islands it was taken in 12 m., at South Georgia in depths ranging from 64 to 195 m., and at Kerguelen in 91 m. The range in depth of the Discovery specimens was 150–300 m.

One of the animals from St. WS 212 had the body full of ova.

9. Phascolosoma ohlini Théel.

Phascolosoma ohlini Théel, 1911, p. 29.
P. ohlini Théel, Fischer, 1920, p. 413.

DISTRIBUTION. South Georgia: Théel, loc. cit.
North of Astrolabe Island, 63° 9′ S, 58° 17′ W: Théel, loc. cit.
Kaiser Wilhelm Land, 66° 2′ S, 89° 38′ E: Fischer, loc. cit.

OCCURRENCE. Falkland Islands: St. WS 840. 368–463 m. One specimen 'from large rock'.
South Georgia: St. WS 33. 130 m. One specimen.
St. 39. 179–235 m. Three very large specimens, one small.
St. 42. 120–204 m. Two medium-sized specimens.
St. 123. 230–250 m. One medium-sized specimen, six small.
St. 149. 200–234 m. Five small to medium specimens.
St. 159. 160 m. One very small specimen.
South Shetlands: St. 196. 720 m. Three small specimens, one with the body full of ova.

These animals agreed well with Théel's description and no comment need be made except that the tentacles may be more numerous than the original description stated. The species is evidently a fairly widespread one from south of the Falklands to the South Shetlands. The Discovery stations are from considerably deeper water than the previous records.

Genus Phascolion Théel

10. Phascolion strombi (Mont.)

Phascolion strombi (Mont.) ?, Théel, 1911, p. 31.

DISTRIBUTION. This species is widely distributed in Arctic and northern waters. In the Antarctic it has been recorded from one station, namely, Shag Rocks Bank (between South Georgia and the Falkland Islands), 53° 34′ S, 43° 23′ W. 160 m. Théel, loc. cit.

OCCURRENCE. South Georgia: St. WS 179. 125 m.
St. 27. 110 m.
St. 42. 120–204 m.
St. 140. 122–136 m.
St. 144. 155–178 m.
St. 159. 160 m.

Near Shag Rocks: St. 160. 177 m.
South Shetlands: St. 175. 200 m.
St. 187. 259 m.
Clarence Island: St. 170. 342 m.

Previously this species was known from only one station in the Antarctic at Shag Rocks Bank as recorded by Théel. In his record he put a question mark after the identification but stated that he could not differentiate his animals from northern ones. Fischer (1920, p. 417) quotes the record without the query, being satisfied that the southern animals were the same as the northern ones. The present specimens agreed with Théel's figures and description, and are regarded as belonging to the species.

Although previously recorded from only one locality it has a much wider area of distribution, since the Discovery specimens came from over a wide area from South Georgia to the South Shetlands. At few points was it common, two or three specimens at each station being the usual catch.

The species usually lives in old shells of gastropods or *Dentalium*, but is often found living free. In these Antarctic collections it was found living free and in shells in about equal proportions, as the following table shows:

St. 27. One large and one small specimen, both living in the same gastropod shell.
St. 42. One large and one small specimen, living in the same gastropod shell.
St 140. Two specimens, living free.
St. 144. Three specimens, living free.
St. 159. Eleven specimens, living free.
St. 160. Three specimens in gastropod shells.
St. 170. One specimen in gastropod shell.
St. 175. Three specimens in gastropod shells, two living free.
St. 187. One specimen, living free.
St. 199. One specimen, living free.

(*b*) SPECIES TAKEN IN SOUTH AFRICAN WATERS AND IN THE EASTERN ATLANTIC

11. Larval sipunculid.

Occurrence. Off South-East Africa: St. 1569. 31° 50·3′ S, 32° 20·5′ E. 12. iv. 35. 1200–300 m. T.Y.F.B.

Only one specimen, about 5 mm. in diameter, was taken. There were numerous very small indistinct papillae scattered over the skin, and there were thirty-six radiating longitudinal muscle bands. On a dark field the animal, preserved in formol, had a bluish appearance and the skin appeared iridescent.

This form was originally considered to be a distinct, but pelagic aberrant, species of sipunculid and was given the name of *Pelagosphaera aloysii* by Mingazzini (1905, p. 713). More recent investigations by Dawydoff (1930, p. 88) have shown that it is an unidentified larva of some sipunculid. Dawydoff was fortunate in securing over thirty live specimens and was able to follow the metamorphosis until the animals had ceased to be pelagic and were developing an elongated body and an opaque skin.

These latter specimens were taken off the coast of Annam. Other localities in which it has been found are the southern Pacific (between Norfolk Island and new Caledonia), the Gulf of Senegal and the seas around Java and the Moluccas.

Genus Sipunculus Linnaeus

12. Sipunculus nudus L.

DISTRIBUTION. This species is widely distributed in the oceans of the world, being recorded from many parts of the Atlantic, Indian and Pacific oceans.

OCCURRENCE. St. WS 128, west side Gough Island, inshore, 40° 19′ 00″ S, 10° 04′ 00″ W. 10. iv. 27. 90–120 m.

Only one specimen was secured. This consisted of the lustrous, translucent and highly iridescent anterior portion of a medium-sized animal. The internal organs were much damaged. There were thirty-two longitudinal muscle bands. The ventral retractors were attached to the second, third and fourth longitudinal muscle bands, while the dorsal retractors were attached to the ninth, tenth and eleventh muscle bands.

Genus Physcosoma Selenka

13. Physcosoma nigrescens Keferstein.

DISTRIBUTION. A widely distributed species occurring in the Indian Ocean, Pacific Ocean and in the Atlantic. In this latter area it has been recorded from the east coast of South America and from the west coast of Africa as far north as the Gulf of Guinea. In the Gulf of Guinea it has been recorded from the Gold Coast, Ilha das Rolas bei Ilha de São Thomé and the Isle of Annobon. It is now recorded for the first time from Ascension and Tristan da Cunha.

OCCURRENCE. Ascension: Clarence Bay: St. 1. 16–27 m.
St. 2. Shore collection 'found in Lithothamnion'.
Tristan da Cunha: St. 4. 40–46 m.
St. 6. 80–140 m.
Gulf of Guinea: Off Annobon. St. 283. 18–30 m.

At St. 1 the animals were mostly large, the largest, which was not fully expanded, measuring about 55 mm. overall. All were distinctly coloured. In each animal the dorsal side of the introvert was red-brown. In some, single red-brown papillae were scattered over the body showing up in marked contrast to the whitish papillae covering the body. In other specimens the red-brown papillae were gathered into small groups giving the animals the appearance of being spotted. Twenty-five specimens were taken.

At St. 2 the ten specimens were considerably smaller than those at St. 1, the largest measuring only some 20 mm. overall. These animals had also red-brown papillae scattered over the body.

At St. 4 some fifty specimens were taken. All were comparatively small, the largest which was more or less fully expanded, measuring only some 30 mm. overall. At this station the animals were all a dirty grey-white and showed no colouring at all.

At St. 6, from fairly deep water, only one small specimen was secured. It also showed no pigmentation.

At St. 283 seven small, three intermediate and four large specimens were taken. The large animals were fully expanded, the largest measuring about 125 mm. overall. Some of them resembled those taken at Ascension in having red-brown papillae scattered over the body.

14. **Physcosoma scolops** Selenka and de Man.

DISTRIBUTION. A cosmopolitan species occurring in many parts of the Indian Ocean, Pacific Ocean and on the southern and western coasts of Africa. Along the coasts of Natal and Cape Province it is one of the commonest intertidal sipunculids, and has been secured at a number of places along these coasts during the recent surveys carried out by the Zoology Department of the University of Cape Town. On the west coast of Africa it has been recorded as far north as the Gulf of Guinea. In this latter area it has been recorded from the Gold Coast, Ilha das Rolas bei Ilha de São Thomé, the Isle of Annobon and the Belgian Congo. The Discovery collections have not greatly extended the known range of distribution on the African coast, but the species is recorded for the first time from Ascension.

OCCURRENCE. Cape Province: Saldanha Bay beach. 1926.
False Bay off Simon's Town: St. 90. 1–2 m.
Ascension: Clarence Bay: St. 1. 16–27 m.

The specimens were quite typical and need no description. The species was not found in any abundance, the numbers at the stations being two, two and one respectively.

Genus Aspidosiphon Diesing

15. **Aspidosiphon mülleri** Diesing.

DISTRIBUTION. This species occurs along the Atlantic coasts of Norway, Britain and France. It is also found in the northern North Sea and in the Mediterranean. On the west coast of Africa it is recorded south to the French Congo. On the east coast of Africa it is known from Suez and Jibouti. Sluiter has also recorded it from the Malay region. In the Gulf of Guinea and neighbourhood it is recorded from Dahomey, southern Nigeria and Kinsembo.

OCCURRENCE. Gulf of Guinea: Off Annobon: St. 283. 18–30 m.
French Congo: Off Cape Lopez: St. 279. 58–67 m.

At St. 283 thirteen specimens were taken, the largest being about 20 mm. overall, while the rest were small.

At St. 279 four small specimens were secured.

PRIAPULIDAE

The family is a small one, only three species being recognized. Of these, two occur in northern seas, and three in southern and Antarctic waters. Of these latter, two are now considered to be only varieties of the northern species. The southern records are as follows:

Priapulus horridus Théel (1911, p. 24).
Uruguay: 33° S, 51° 10′ W. 80 m.

Priapulus bicaudatus Danielssen var. *australis* de Guerne. De Guerne (1888, p. 13).

Patagonia: 44° 47′ S, 65° 56′ W. 90 m.
South Shetlands: Sound of Navarin. 200 m.

Priapulus caudatus Lamarck var. *tuberculato-spinosus* Baird.

From many parts of the Antarctic.

Only the last named appeared in the Discovery collections. In addition, Benham (1916) reports that a single specimen was found in the collections made by F.I.S. 'Endeavour', but there was no note of the locality in which it was taken. Although already recorded from the Antarctic seas, no specimen had been found so far north in the southern hemisphere, since the 'Endeavour' did not enter the Antarctic.

Genus Priapulus Lamarck

16. Priapulus caudatus Lamarck var. tuberculato-spinosus Baird.

P. tuberculato-spinosus Baird, 1868, p. 106; de Guerne, 1888, p. 9.
P. humanus Lamarck var. *antarcticus* Michaelsen, 1889, p. 10.
P. caudatus Lamarck var. *antarcticus* Michaelsen, Fischer, 1896, p. 10.
P. humanus (Lamarck) var. *antarcticus* Michaelsen, Collin, 1901, p. 299.
P. caudatus Lamarck, Shipley, 1902, p. 284.
P. caudatus Lamarck forma *tuberculato-spinosus* Baird, Théel, 1911, p. 18.
P. caudatus Lamarck var. *antarcticus* Michaelsen, Fischer, 1920, p. 419.
P. caudatus var. *tuberculato-spinosus* Baird, Benham, 1922, p. 6.
P. caudatus Benham, 1932, p. 890.

DISTRIBUTION. Commonwealth Bay, Macquarie Island: Benham (1922).
Falkland Islands: Baird; de Guerne; Théel.
Graham Land Region: Théel.
Island of Navarin, Puerto Toro: Fischer; Michaelsen.
Kerguelen: Collin; Fischer.
New Zealand: Benham (1932).
Orange Bay: de Guerne.
Patagonia: Théel.
South Georgia: Fischer; Michaelsen; Théel.
Straits of Magellan: de Guerne.
Tierra del Fuego: Fischer.
Victoria Land, Cape Adare: Shipley.

OCCURRENCE. South Georgia. St. 141. 17–27 m. Two specimens.
St. 144. 155–178 m. One specimen.
Fish trap, stomach of *Notothenia rossi*. 4–5 m. 22. xii. 28. One specimen.
Falkland Islands: Port Stanley, shore collection. One specimen.
South Orkneys: St. 167. 244–344 m. Two specimens.
St. 1961. 340–360 m. Three specimens.
South Shetlands: St. 195. 391 m. One specimen.
St. 1873. 210–180 m. One specimen.
St. 1952. 367–383 m. One specimen.

This species has been very fully described by Théel (1911, p. 18), and there is nothing to add to his description. The varietal name of the species has been subject

to a good deal of alteration, some authors preferring to use Michaelsen's name of *antarcticus*, while others have preferred Baird's name of *tuberculato-spinosus*. While the atter is clumsy, I see no reason why Baird's name should not stand, as it is now recognized that Baird's specimen belongs to this variety, in spite of trivial discrepancies in his description.

This form is widely distributed in the Antarctic seas. It was taken at nine of the Discovery stations, thirteen specimens in all being secured. Of the nine stations only four were in areas from which the species had been previously recorded, and the remaining five, namely, the South Orkneys, South Shetlands, and the area lying between these two groups of islands, are new localities.

The range in depth of the stations was considerable. At Port Stanley it was taken on the shore; at South Georgia from 4 to 178 m., while in the South Shetlands the records all come from depths ranging from 210 to 391 m. The specimens varied considerably in size, but in most cases they were too contorted to allow of any accurate measurements being made. The smallest, only some 5 mm. overall and taken in the beginning of January, came from St. 144, South Georgia. The next smallest specimen, taken in February, was about 11 mm. in length, and came from St. 167, off Signy Island, South Orkneys. The other specimens in order of size were considerably larger and this would suggest that breeding takes place in late summer.

The largest specimens came from the South Shetlands, the body and introvert being between 90 and 100 mm. overall.

As it is usual to see these animals with the natural colours lost in the course of preservation, the following notes made of the colours for five of the specimens when collected may be of interest.

St. 1873. 'Pale in colour, except the introvert, which is brown.'

St. 1952. 'Colour generally a pale dirty yellow-brown; caudal vesicles a dull, but deeper, yellow-brown: teeth dark brown.'

St. 1961. (*a*) 'Colour throughout a pale dull dirty cream.' (*b*) 'Colour throughout a pale dirty cream.' (*c*) 'Colour pale cream.'

In the two last specimens the full colour may not have been developed, since the specimens were comparatively small and may have been fairly young.

LITERATURE CITED

Baird, W., 1868. *Monograph of the species of worms belonging to the subclass Gephyrea.* Proc. Zool. Soc. Lond.

—— 1873. *Description of some new species of Annelida and Gephyrea in the collection of the British Museum.* J. Linn. Soc. (Zool.), xi.

Benham, W. B., 1916. *Report on the Polychaeta obtained by F.I.S. 'Endeavour' on the coasts of New South Wales, Victoria, Tasmania and South Australia.* III. *Report on the Gephyrean* Priapulus *obtained by F.I.S. 'Endeavour' in Australian waters.* Fish. Commonw. Australia, iv.

—— 1922. *Gephyrea inermia.* Sci. Rep. Aust. Antarctic Exp. 1911–14. Series C, vi, pt. 5.

—— 1932. Priapulus caudatus *in New Zealand waters.* Nature, Lond., cxxx.

Collin, A., 1901. *Die Gephyreen der Deutschen Expedition S.M.S. 'Gazelle'.* Arch. Naturgesch., 67. Jahrgang, Beiheft.

Dawydoff, C. N., 1930. *Quelques observations sur Pelagosphaera, larve de Sipunculide des côtes d'Annam.* Bull. Soc. Zool. Fr. LV.

Fischer, W., 1896. Gephyrea, *in Hamburger Magalhaensische Sammelreise*, Lief. 1.

—— 1916. *Die Gephyreenausbeute der Deutschen Tiefsee-Expedition*, 1898–9. Vorläuf. Mitt., im Zool. Anz. XLVIII, no. 1.

—— 1920. *Gephyreen der antarktischen und sub-antarktischen Meere.* Deutsche Süd-Polar Expedition, XVI. Zoologie, VIII.

—— 1924. *Beitrag zur Kenntnis der Sipunculiden. Ueber die verwandtschaftlichen Beziehungen der Arten* Phascolosoma margaritaceum *Sars*, Phasc. hanseni *Dan. und Kor.*, Phasc. trybomi *Théel.* Zool. Anz. LVIII.

—— 1925. *Echiuridae, Sipunculidae, Priapulidae. Tierwelt N.- u. Ostsee.* Lief. 1, Teil VI*d*. Leipzig.

de Guerne, J., 1888. *Priapulides.* Mission scientifique du Cap Horn, 1882–3, VI, Zoologie. Paris.

Hérubel, M. A., 1908. *Géphyriens.* Expédition Antarctique Français, 1903–5.

Koren, J. and Danielssen, D. C., 1881. *Norwegian North Atlantic Expedition*, 1876–8, pt. iii.

Lanchester, W. F., 1908. *Sipunculoidea.* National Antarctic Expedition, 1901–4, IV.

Michaelsen, W., 1889. *Die Gephyreen von Süd-Georgien nach der Ausbeute der Deutschen Station von* 1882–3. Jb. hamburg. wiss. Anst. VI, Hamburg.

Mingazzini, P., 1905. *Un Gefireo pelagico*: Pelagosphaera aloysii. Atti Accad. Lincei, Ser. 5, XIV.

Müller, M., 1852. *Observationes de vermibus quibusdam maritimis.* Diss. Berlin.

Pratt, E. M., 1898. *Contribution to our knowledge of the marine fauna of the Falkland Islands.* Mem. Manchr Lit. Phil. Soc. XLII, no. 13.

Sars, M., 1851. Nyt Mag. Natur. VI. Bed.

Sato, H., 1939. *Studies on the Echiuroidea, Sipunculoidea and Priapuloidea of Japan.* Sci. Rep. Tôhoku Univ. XIV, no. 4.

Seitz, Ph., 1907. *Der Bau von* Echiurus chilensis (*Urechis n.g.*). Zool. Jb. XXIV, Heft 2, Abt. für Anat. u. Ontogenie.

Selenka, E., 1885. *Report on the Gephyrea collected by H.M.S. 'Challenger' during the years* 1873–76. Rep. Sci. Results of the Voyage of H.M.S. 'Challenger'. Zool., XIII, no. 2.

Shipley, A. E., 1899. *Willey's Zoological Results*, III.

—— 1902. *Natural History Collections of the 'Southern Cross'.* London.

Spengel, J. W., 1912. *Beiträge zur Kenntnis der Gephyreen.* IV. *Revision der Gattung* Echiurus. Zool. Jb. XXXIII, Abt. für Systematik.

Stephen, A. C., 1936. *The Echiuridae, Sipunculidae and Priapulidae of Scottish and adjacent waters.* Proc. R. Phys. Soc. Edinb. XXII, pt. 4.

—— *Report on the Sipunculids collected by the B.A.N.Z.A.R. Expedition*, 1929–31. (In the Press.)

Studer, Th., 1879. Vide Collin, 1901.

—— 1879. Thalassema verrucosa *sp.nov.* Arch. Naturgesch. XLV.

Théel, H., 1905. *Northern and Arctic invertebrates in the collection of the Swedish State Museum.* 1. *Sipunculids.* K. svenska Vetensk. Akad. Handl. XXXIX, no. 1.

—— 1911. *Priapulids and Sipunculids dredged by the Swedish Antarctic Expedition*, 1901–3. K. svenska Vetensk. Akad. Handl. XLVII. Uppsala and Stockholm.

Wesenberg-Lund, 1934. *Gephyreans and Annelids. The Scoresby Sound Committee's second East Greenland Expedition in* 1932 *to King Christian IX's Land.* Medd. Gronland, CIV, no. 14.